

NON-PROVISIONAL APPLICATION FOR UNITED STATES PATENT

FOR

**METHOD AND APPARATUS
FOR POSITION BIDDING**

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RELATED APPLICATION

This application is a non-provisional application of provisional application serial number 60/450,597, filed on 2/26/03, titled "METHOD AND APPARATUS FOR ON-LINE QUERY ANSWER SET POSITION BIDDING," claims priority to said provisional application, and fully incorporates its specification and drawing by reference.

FIELD OF THE INVENTION

[0001] The present invention relates generally to the fields of data processing and electronic advertising. More specifically, the present invention relates to on-line query answer set or contextual advertisement position bidding. On-line query answer set may also be referred to as on-line search result answer/return set.

BACKGROUND OF THE INVENTION

[0002] In conventional systems, marketing purchases (also referred to as advertisement buys) are typically optimized individually and performance measurement and purchase decisions are made separately for each marketing option. An organization can have a large number of available marketing options (advertisement buys) that are priced differently, and deliver different results. For example, search engines have paid listing, where the cost per click to bring a visitor from the search engine is different based on the keyword that the visitor on the search engine searched for and the position at which the advertisement is displayed. Similarly, most web sites have different charges for different contextual advertisement positions.

[0003] Thus, an approach that enables a decision maker to make marketing purchase (advertisement buy) decisions, by allocating dollars across a portfolio of marketing options (advertisement buys) so as to meet specific composite goals and performance criteria, is desirable.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] The present invention will be described by way of exemplary embodiments, but not limitations, illustrated in the accompanying drawings in which like references denote similar elements, and in which:

[0005] Fig. 1 is an overview illustrating the present invention according to one embodiment.

[0006] Fig. 2 is a block diagram illustrating a computing device suitable for use to practice the present invention.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0007] Embodiments of the present invention includes a system and its components that enable a decision maker to make marketing purchase (advertisement buy) decisions, by allocating dollars across a portfolio of marketing options (advertisement buys) so as to meet specific composite goals and performance criteria.

[0008] In the description to follow, embodiments of the present invention will be described using terminologies commonly employed by those skilled in the art to present their work, including but not limited to terms like, web site, web pages, clicks, on-line query, search engine, answer set, modeling, regression analysis, optimization, objective functions, constraints, and so forth. These terms are to be accorded the common meaning as understood by those of the ordinary skill in the arts of information technology and applied mathematics.

[0009] Process Flow

[0010] In one embodiment, the process of the present invention may comprise of the following operations:

[0011] - Model

[0012] - Optimize

[0013] - Execute

[0014] Each aspect will be described in turn, referencing **Fig. 1**.

[0015] Model

[0016] In one embodiment, the system may include modeling **510** for the different marketing options (advertisement buys) available to an organization. The modeling parameters **512** may include, but are not limited to the number of visitors, the cost of bringing the visitors, number of unique visitors, transactions, the revenues generated by the visitors, and so forth. The models could be statistical models based on measurable empirical data **506**.

[0017] In one embodiment, the models are constructed by gathering empirical data **506** by purchasing the various marketing options for a limited period of time, and measuring the resulting clicks, visitors, transaction, revenues, and so forth **502** and **504**. Further, for the embodiment, a least mean squared fit over the empirical data may be performed to determine the expected values of the model parameters **512**, using a modeling software **508** like AMPL (a modeling language for linear programming) or Splus (software for statistical modeling). E.g. for the paid listings on search engines like Overture and Google, empirical data for different keywords at different positions may first be obtained, and then, the ratio of clicks at position i to clicks at position $i+1$ through a least mean squared regression, may be determined. Using this model, the traffic that can be generated at different positions and/or for different keywords may be inferred.

[0018] In various embodiments, the models include in particular a click model that forecast the number of clicks for the various on-line query answer set or contextual advertisement positions available from various search engines and/or web sites, and a revenue model that forecast the revenue based at least in part on click conversion.

[0019] Optimize

[0020] In one embodiment, once the models for the different variables that are within the scope to improve or control, the models **510** may be specified to perform an optimization of the measurable objectives **514** that have been modeled such as number of unique visitors, number of transactions, revenues, profits, etc. that can be generated by using some combination of the marketing options. The specification may be effectuated through a variety of input techniques. In various embodiments, a graphical user interface is provided to specific the models **510**, or more specifically, the model parameters and their relationships **512**. The optimization of these objectives **514** may be subject to constraints **516** that involve controlling some other measurable modeled variables such as the money spent on marketing, certain minimum lead generation requirements, etc.

[0021] The optimization problem may be modeled as a mathematical programming problem e.g. if all the models involved are linear models the optimization problem is a linear programming problem, which can be solved using a standard linear programming/optimization solver like CPLEX or MINOS **518**. In other embodiments, the optimization problem may be formulated as a non-linear problem, and solved employing any one of a number of non-linear optimization techniques. The solution to the optimization problem can be a set of marketing purchase decisions or a market budget allocation strategy (also referred to as a bidding strategy) **520** that needs to be executed by the organization.

[0022] Objective functions

[0023] In various embodiments, the measurable goals (or objectives) **512** that may be used may be one or more of the followings

[0024] - Maximize traffic (also referred to as clicks) for the marketing options for a given budget

[0025] - Minimize cost to get certain traffic for the marketing options

[0026] - Minimize customer or visitor acquisition cost for the products or services of the marketing options

[0027] - Maximize revenues for the products or services of the marketing options

[0028] - Maximize profits for the products or services of the marketing options

[0029] - Minimize marketing expenses for the marketing options

[0030] - Maximize increases of customer sign-ups or registrations for products or services of the marketing options

[0031] In alternate embodiments, other objective functions **512** may be employed in addition to or in lieu of the earlier enumerated objective functions.

[0032] Constraints

[0033] In various embodiments, the measurable constraints on the marketing decisions may be one or more of the following enumerated constraints:

[0034] - Traffic to certain URLs (Uniform Resource Locators) should exceed certain amount during a certain period

[0035] - Certain keywords should be at specified position

[0036] - Cost per click should not exceed certain amount

[0037] - User acquisition costs should be below certain amount

[0038] - Marketing expenses for the marketing options should be below a budget limit

[0039] - Revenues generated for products or services of the marketing options should be below a limit

[0040] Execute

[0041] In various embodiments, the marketing strategy or spending decisions (bidding strategy) **520** may be implemented **522** to make buys **524**. The implementation may also be monitored and adjusted **522** in the context of the changing marketing options available **526** and the changing objectives and requirements of the organization **514** and **516** (re-performing the earlier described optimization operation). For example, based on the availability of cheaper marketing options **526**, a decision may be made to stop an advertising campaign at a specific site or for paid listings on search engines, the bid or the maximum cost per click that an organization presumably is willing to pay for a paid listing for a keyword, may be changed, based on the gross margins generated from transactions made by visitors clicking on that keyword listing. In various embodiments, the results of the implementations are captured as reports **528**, and the data contained in the reports **528** are fed back to add to or update the empirical data employed to build the models **510**. If necessary, the models **510** may be updated, and the optimization process **518** may be re-performed to yield a new bidding strategy **520**.

[0042] Making a market in marketing

[0043] The present invention may also be employed to create a market in marketing options, where sites “the sellers” with marketable visitors can ask

varying rates for different advertising options and the organizations that need those visitors “the buyers” bid different prices for the different options depending on the value they associate with the visitor. An entity can then play the role of the market maker in such a market by matching the buyers with the sellers for a commission.

[0044] The market maker can match buyers and sellers by simply presenting the various options to the buyers and sellers and let them make their decisions individually. The market also supports the role of a broker, who can also take the objectives of one or multiple sellers to optimize their marketing objectives for a commission. For paid listings on search engines, the price for a click from a certain position on the search results page for a certain keyword depends on the price that different “buyers” are willing to bid for that position. This can sometimes create bidding wars between buyers that result in them collectively paying a high price for their clicks. A broker, by pulling together the different competing buyer entities, can collectively optimize the different objectives and requirements thereby providing a lower cost solution to the sellers that meet their objectives.

[0045] Exemplary System

[0046] Figure 2 illustrates an example computing system/device suitable for use to practice the present invention, in accordance with one embodiment. As shown, computing system/device **600** includes one or more processors **602**, and system memory **604**. Additionally, computing system/device **600** includes mass storage devices **606** (such as diskette, hard drive, CDROM and so forth), input/output devices **608** (such as keyboard, cursor control and so forth) and communication interfaces **610** (such as network interface cards, modems and so forth). The elements are coupled to each other via system bus **612**, which represents one or more buses. In the case of multiple buses, they are bridged by one or more bus bridges (not shown).

[0047] Each of these elements performs its conventional functions known in the art. In particular, system memory **604** and mass storage **606** may be employed

to store a working copy and a permanent copy of the programming instructions implementing one or more aspects of the earlier described teachings to practice the present invention, i.e. the modeling, the optimization, the bidding and so forth. The programming instructions may be implemented in assembler instructions supported by processor(s) **602** or high level languages, such as C, that can be compiled into such instructions. The communication to place the bids may be implemented in any one of a number of proprietary or open communication/transaction protocol, including but are not limited to HTTP and TCP/IP.

[0048] The permanent copy of the programming instructions may be placed into permanent storage **606** in the factory, or in the field, through e.g. a distribution medium (not shown) or through communication interface **610** (from a distribution server (not shown)).

[0049] Except for the modeling, optimization, and bidding logic, the constitution of these elements **602-612** are known, and accordingly will not be further described.

[0050] Epilog

[0051] Although specific embodiments have been illustrated and described herein for purposes of description of the preferred embodiment, it will be appreciated by those of ordinary skill in the art that a wide variety of alternate and/or equivalent implementations may be substituted for the specific embodiment shown and described without departing from the scope of the present invention. Those with skill in the art will readily appreciate that the present invention may be implemented in a very wide variety of embodiments. This application is intended to cover any adaptations or variations of the embodiments discussed herein. Therefore, it is manifestly intended that this invention be limited only by the claims and the equivalents thereof.